

U.S. Patent

Aug. 24, 2003

Sheet 5 of 5

US 6,611,571 B1

FIG. 5

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graph TD
    X((X)) --> 101[A/D CONVERTER]
    101 --> 102[DELAY COMPENSATOR]
    102 --> 103[NINETY-DEGREE PHASE SHIFTER]
    103 -- Y --> 104[PHASE ANGLE CALCULATOR]
    104 --> 105[DIFFERENTIATOR]
    105 --> 106[D/A CONVERTER]
    106 --> F((F))
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U.S. PAT. NO. 6,611,571

DOCUMENT IDENTIFIER

TITLE: Apparatus for angle demodulation

KWIC

Abstract Text - ABTX

An angle demodulator (31) in the form of a transformer (31) and to transformer (31) allows and supplied it to the (34) calculates a phase frequency control unit (34) cosine wave and on the shifts ninety degrees of product calculation and supplies to the frequency control unit (34) including a value of the (34) and a vector including the frequency control unit (34) product so as to supply the determined representing the value signal as a result of D/A

Brief Summary Text - B

A conventional angle composed of an FM demodulator (31) and a signal to that of the FM signal

66

ENTIFIER

Apparatus

ABTX (1) duator form of and to allows the ou phase unit (3 an inst res ou on secti sequenc of the r includi control u as to d etermined value c of D/A

Text - B angle (FM den d a signi signal.

Text - B dulator FM signi ninety signal b

Text - B in FIG. 5 a delay c

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EAST Browser - L36 (126) phase neu3 [US 5440269 | Tab: S | Doc: 50/126 | "Full" 1/12 (Total images 12) | Front Page]

US-PAT-NO: 5440269

DOCUMENT-IDENTIFIER

TITLE: Digital FM demodulator having an address circuit for a lookup table

— KWIC —

TITLE - TO (1): Digital FM demodulator

Brief Summary Text of Frequency demodulation carried out as follows:

Brief Summary Text of An input signal in the 12, which delays the input simultaneously, a first predetermined time, of cosine wave, i.e., the phase shifter 12 is output delay 11. A magnitude value of the sine wave, absolute value of the comparison, if the absolute value of the sine wave signal, as an address of sine wave, the cotangent 49 reads out and outputs from divider 14.

Brief Summary Text of (a) generating a delay

United States Patent [19] (11) Patent Number: 5,440,269

Hwang (45) Date of Patent: Aug. 8, 1995

[34] DIGITAL FM DEMODULATOR HAVING AN ADDRESS CIRCUIT FOR A LOOKUP TABLE

[75] Inventor: Deog-won Hwang, Seoul, Rep. of Korea

[73] Assignee: Samsung Electronics Co., Ltd., Kyungki-do, Rep. of Korea

[21] Appl. No.: 302,312

[22] Filed: Sep. 8, 1994

[30] Foreign Application Priority Data

Sep. 8, 1993 [KOR] Rep. of Korea 93-19014

[51] Int. Cl.⁶ H03D 3/02

[52] U.S. Cl. 329/314; 329/341; 375/324; 455/214

[53] Field of Search 329/314, 329/341, 329/342, 343; 375/324; 455/214

[56] References Cited

U.S. PATENT DOCUMENTS

4,862,099 5/1989 Patel et al. 329/341

4,994,754 2/1991 Chen 329/314

Primary Examiner—Siegfried H. Grimm

Attorney, Agent, or Firm—Sughrue, Mifflin, Zinn, Macpeak & Saxe

[57] ABSTRACT

In a digital frequency demodulator, data representing the input signal to be demodulated is prestored in a look-up table and signal processing is digitally performed to generate a read address required for reading out the data stored in the look-up table using a phase shift method of operation. Phase-shifting is performed by determining the slope of a frequency-modulated signal containing a signal which does not cross the zero axis. Thus, the precision of the frequency demodulation is enhanced, and the frequency demodulation data stored in the look-up table is minimized to reduce the size of a ROM used for the look-up table. The digital frequency demodulator includes a look-up table for storing frequency demodulation data, an address generating circuit for computing the magnitude of the absolute value of frequency modulated signal and a phase-shifted version thereof so as to generate address information for the look-up table and a comparison signal, a circuit for determining the slopes of the frequency-modulated and phase-shifted signals and, responsive thereto, generating slope determination signals, and a phase compensator for operating on the output from the look-up table in response to the slope determination signals and the comparison signal to thereby expand the phase value output from the look-up table. A method for operating a digital frequency demodulator is also revealed.

15 Claims, 5 Drawing Sheets

LAST Browser - 1.43 (2) ("1052099") | US 4862099 | Tag: S | Doc: 2/2 | "Full" 1/3 (Total images: 3) | Front Page

US-PAT-NO: 4862099

DOCUMENT IDENTIFIER

TITLE: Digital

— KWIC —

US Patent No. - PN (7): 4862099

United States Patent

(11) Patent Number: 4,862,099
(12) Date of Patent: Aug. 29, 1989

(13) Inventor: Nobuo Kobayashi, Tokyo, Japan

(14) Assignee: Mitsubishi Densetsu Kabushiki Kaisha, Tokyo, Japan

(15) Appl. No.: 333,143

(16) Filed: Aug. 17, 1989

(17) Foreign Application Priority Data: Aug. 18, 1987 (JP) Japan 63-303317

(18) Int. Cl. H03D 9/00

(19) U.S. Cl. 328/136; 328/143; 328/127; 328/130; 328/125; 360/30

(20) Field of Search: 328/136, 107, 110, 124, 328/143, 328/124, 373/92, 373/93, 373/94, 360/30

(21) References Cited: U.S. PATENT DOCUMENTS 4,451,011 6/1984 Motorola 328/124

OTHER PUBLICATIONS "Experiments on VTR Digital Signal Processing"

(22) Abstract: A frequency demodulator includes an analog-to-digital converter for converting an inputted FM signal into a digital signal. A 90° phase shifter is used to phase shift the converted digital signal. The phase shifted signal and the converted signal are utilized to determine the results of the calculation. X represents the converted signal, and Y represents the phase shifted signal. The result from the calculation is delayed for a period of one sampling cycle. The frequency demodulator also includes a subtractor for subtracting the delayed signal from the calculation result. A discontinuity corrector corrects any discontinuity in an output from the subtractor, and a reversal phenomenon compensator compensates the output from the discontinuity corrector when the output from the discontinuity corrector exceeds a predetermined range of levels. These levels correspond to an approximation of discrete lines of black or white color on a reproduced picture.

(23) Claims: 2 Drawing Sheets

EAST Browser - L36 (126) phase array3 [US 5119199 | Taj S | Doc: 64/126 | "Full" 1/12 (Total images 12) | Front Page]

United States Patent (19) 5,119,199
Sakamoto

(11) Patent Number: 5,119,199
(45) Date of Patent: Jun. 2, 1992

(34) FM DEMODULATOR FOR VIDEO TAPE RECORDER

(73) Invention: Shiro Sakamoto, Kanagawa, Japan
(72) Assignee: Sanyo Corporation, Tokyo, Japan
(21) Appl. No.: 077,839
(22) Filed: May 24, 1988
(30) Foreign Application Priority Data
May 25, 1989 [JP] Japan 1-913220
Jun. 14, 1990 [JP] Japan 1-902633
(31) Int. Cl. H04N 5/433
(32) U.S. Cl. 358/158; 358/314; 358/316
(51) Field of Search 358/158, 358/314, 358/316, 358/317, 358/318, 358/319

FOREIGN PATENT DOCUMENTS
45-11996 6/1967 Japan
Primary Examiner—James J. O'Grady
Assistant Examiner—Jeffrey R. Merrill
Attorney Agent or Firm—JLL, Van Seters, Bradman & Simpson

ABSTRACT
An input for receiving FM modulated video signals is connected to a first demodulator circuit, the output of which is connected to the first input of an adder. The input is also connected to a transversal filter, the output of which feeds a Hilbert transform circuit that has its output connected to a second demodulator circuit. The output of the second demodulator is connected to a second input of the adder. The adder providing an FM demodulated video signal with reduced noise and improved signal-to-noise ratio. In a second embodiment, the Hilbert transform circuit is formed by delay circuits and a subtraction circuit connected to subtract the output of the delay circuit from the input circuit. An adder is connected to add the output of the delay circuit to the input circuit. First and second demodulation circuits receive the outputs from the subtractor and adder, respectively, and the outputs of the first and second demodulation circuits are mixed to produce the FM demodulated video signal.

References Cited
U.S. PATENT DOCUMENTS
3,543,415 1/1971 Enomoto 358/158
3,554,095 12/1971 Akizawa et al. 358/158
4,021,340 1/1976 Shiohara 358/158
4,029,994 12/1976 Shiohara et al. 358/158
4,094,432 6/1977 Morioka 358/158
4,713,332 11/1982 Ooster et al. 358/158
4,804,534 2/1985 Channing et al. 358/158
4,918,460 3/1990 Ooster et al. 358/158
4,979,920 2/1990 Sakamoto 358/158
4,991,452 9/1990 Harjo 358/158

4 Claims, 6 Drawing Sheets

HP-032

Details Text Image HTML Full

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